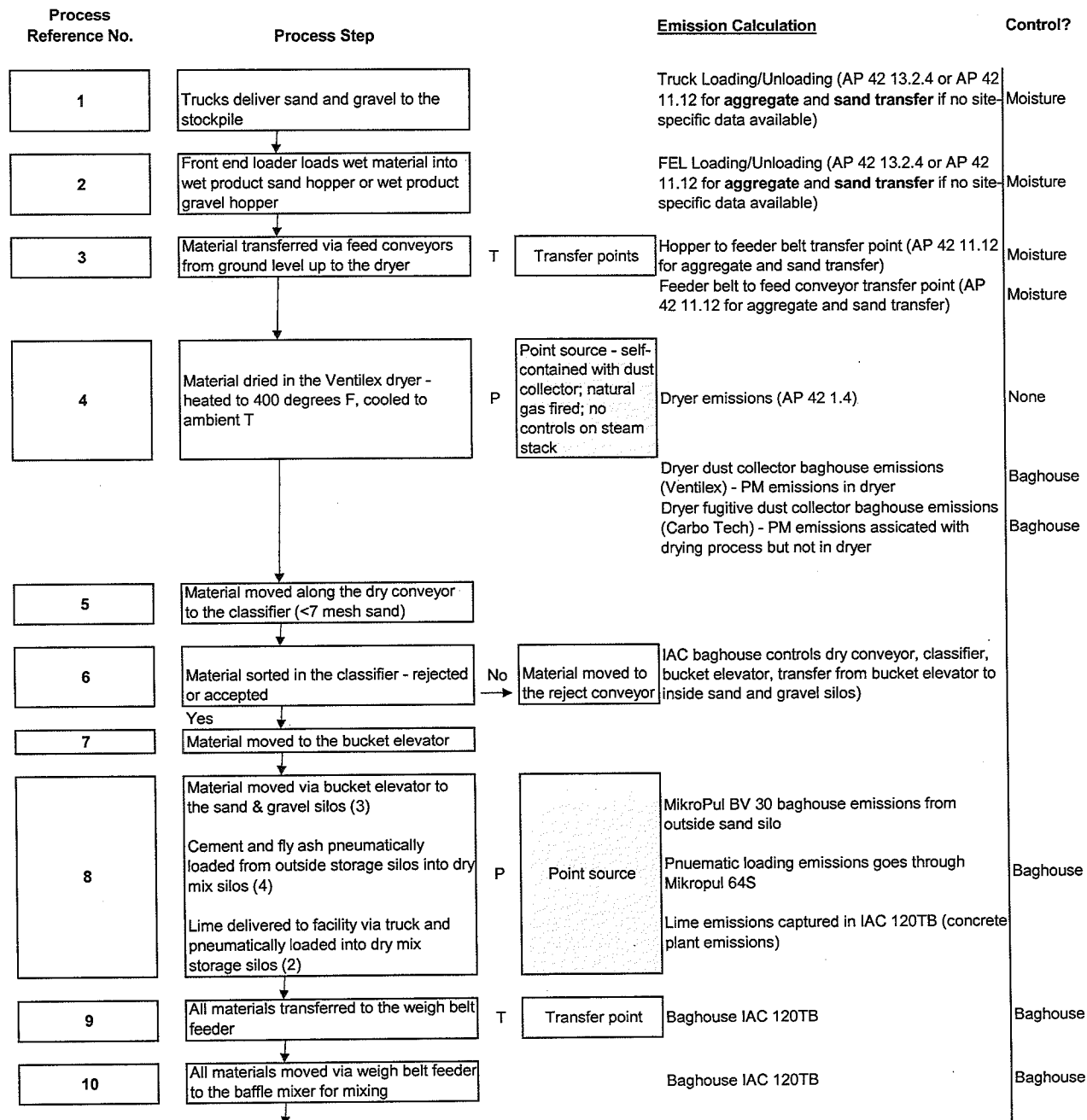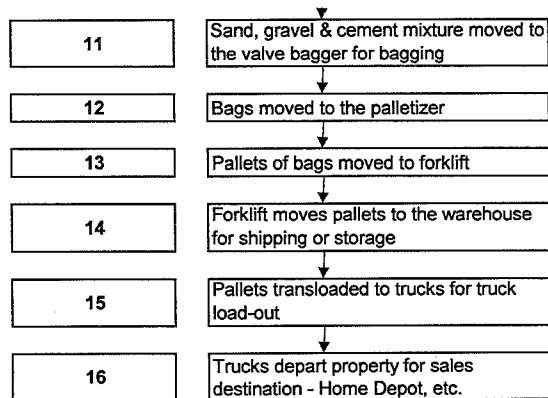# APPENDIX B

EMISSION CALCULATIONS

Handy Truck Lines - Meridian Terminal, ID
Air Quality Permit to Construct Application
Process Flow Diagram

Process Reference No.	Process Step			Emission Calculation	Control?
1	Trucks deliver sand and gravel to the stockpile			Truck Loading/Unloading (AP 42 13.2.4 or AP 42 11.12 for **aggregate** and **sand transfer** if no site-specific data available)	Moisture
2	Front end loader loads wet material into wet product sand hopper or wet product gravel hopper			FEL Loading/Unloading (AP 42 13.2.4 or AP 42 11.12 for **aggregate** and **sand transfer** if no site-specific data available)	Moisture
3	Material transferred via feed conveyors from ground level up to the dryer	T	Transfer points	Hopper to feeder belt transfer point (AP 42 11.12 for aggregate and sand transfer)	Moisture
				Feeder belt to feed conveyor transfer point (AP 42 11.12 for aggregate and sand transfer)	Moisture
4	Material dried in the Ventilex dryer - heated to 400 degrees F, cooled to ambient T	P	Point source - self-contained with dust collector; natural gas fired; no controls on steam stack	Dryer emissions (AP 42 1.4)	None
				Dryer dust collector baghouse emissions (Ventilex) - PM emissions in dryer	Baghouse
				Dryer fugitive dust collector baghouse emissions (Carbo Tech) - PM emissions assicated with drying process but not in dryer	Baghouse
5	Material moved along the dry conveyor to the classifier (<7 mesh sand)				
6	Material sorted in the classifier - rejected or accepted	No →	Material moved to the reject conveyor	IAC baghouse controls dry conveyor, classifier, bucket elevator, transfer from bucket elevator to inside sand and gravel silos)	
7	Yes ↓ Material moved to the bucket elevator				
8	Material moved via bucket elevator to the sand & gravel silos (3)

Cement and fly ash pneumatically loaded from outside storage silos into dry mix silos (4)

Lime delivered to facility via truck and pneumatically loaded into dry mix storage silos (2) | P | Point source | MikroPul BV 30 baghouse emissions from outside sand silo

Pnuematic loading emissions goes through Mikropul 64S

Lime emissions captured in IAC 120TB (concrete plant emissions) | Baghouse |
| 9 | All materials transferred to the weigh belt feeder | T | Transfer point | Baghouse IAC 120TB | Baghouse |
| 10 | All materials moved via weigh belt feeder to the baffle mixer for mixing | | | Baghouse IAC 120TB | Baghouse |

11	Sand, gravel & cement mixture moved to the valve bagger for bagging		Baghouse IAC 120TB	Baghouse
12	Bags moved to the palletizer			
13	Pallets of bags moved to forklift			
14	Forklift moves pallets to the warehouse for shipping or storage			
15	Pallets transloaded to trucks for truck load-out			
16	Trucks depart property for sales destination - Home Depot, etc.			

HTL Throughput

45 tons/hr	dryer sand and gravel feed rate
24 hrs/day	maximum hours of operation
365 days/yr	maximum days of operation
394,200 tons/yr	maximum sand and gravel throughput
66.67 %	sand throughput
262,800 tons/yr	**sand throughput**
33.33 %	gravel throughput
131,400 tons/yr	**gravel throughput**
75 %	percent of final product that is gravel and sand
525,600 tons/yr	**concrete production**
20 %	percent of final product that is cement
105,120 tons/yr	**cement used for concrete production**
600,000 tons/yr	**cement delivered to HTL**
494,880 tons/yr	**cement shipped off-site to other vendors**
5 %	percent of final product that is lime and fly ash
26,280 tons/yr	lime and fly ash in final concrete
60 %	percent of lime in lime/fly ash total
40 %	percent of fly ash in lime/fly ash total
15,768 tons/yr	**lime throughput**
10,512 tons/yr	**fly ash used by HTL for concrete production**
335,000 tons/yr	**maximum fly ash delivered to facility**
324,488 tons/yr	**fly ash shipped off-site to other vendors**

Source Description	Model ID	Source UTM Location[1]		Base Elevation (m)	Stack/ Release Height (m)[2]	Temperature (K)	Flow Rate (ft³/min)	Velocity (m/s)	Diameter (m)	Sigma-y (m)[3]	Sigma-z (m)[4]	Long-Term Emission Rates (g/s)		Short-Term Emission Rates
		Easting (m)	Northing (m)									NOx	PM₁₀	PM₁₀
Volume Sources														
Truck Material Handling	TRUCK	549731.5	4828422.2	797.0	4.6	n/a	n/a	n/a	n/a	0.57	2.13	n/a	0.00827	0.01802
													0.066	0.143
Front-End Loader Material Handling	FEL	549728.2	4828442.8	797.0	5.0	n/a	n/a	n/a	n/a	0.43	2.33	n/a	0.00827	0.01802
													0.066	0.143
Feeder Belt Transfer	FB	549728.2	4828447.0	797.0	3.0	n/a	n/a	n/a	n/a	1.77	1.42	n/a	0.00998	0.02175
													0.079	0.173
Feed Conveyor Transfer	FC	549728.2	4828452.3	797.0	6.1	n/a	n/a	n/a	n/a	1.77	1.42	n/a	0.00998	0.02175
Point Sources														
Ventilex B.V. Fluid Bed Dryer & Cooler Baghouse	BH1	549735.6	4828466.0	797.0	9.1	477.6	11,000	10.01	0.81	n/a	n/a	n/a	0.0238	0.0520
													0.189	0.412
Dryer Fugitive Dust Collector Baghouse	BH2	549725.5	4828447.0	797.0	11.6	298.0	15,000	19.06	0.69	n/a	n/a	n/a	0.0372	0.0810
													0.295	0.643
Plant and Fugitive Dust Collector Baghouse	BH3	549721.4	4828466.6	797.0	9.1	298.0	18,000	16.38	0.81	n/a	n/a	n/a	0.1784	0.3888
													1.416	3.086
Outside Storage Silo Fugitive Dust Baghouse	BH4	549721.4	4828463.2	797.0	20.1	298.0	508	6.20	0.22	n/a	n/a	n/a	0.0050	0.0110
													0.040	0.087
Fly Ash Bin Vent Filter No. 1	BH5	549719.4	4828565.6	797.0	26.2	298.0	1,200	24.40	0.17	n/a	n/a	n/a	0.0119	0.0259
													0.094	0.206
Fly Ash Bin Vent Filter No. 2	BH6	549725.4	4828565.6	797.0	26.2	298.0	1,200	24.40	0.17	n/a	n/a	n/a	0.0119	0.0259
													0.094	0.206
Fly Ash Bin Vent Filter No. 3	BH7	549731.4	4828565.6	797.0	26.2	298.0	1,200	24.40	0.17	n/a	n/a	n/a	0.0119	0.0259
													0.094	0.206
Fugitive Fly Ash Baghouse	BH8	549725.4	4828570.6	797.0	7.6	298.0	4,523	33.10	0.29	n/a	n/a	n/a	0.0448	0.0977
													0.356	0.775
Ventilex Dryer	DRYER	549735.6	4828466.0	797.0	9.1	477.6	11,000	10.01	0.81	n/a	n/a	0.061	0.0043	0.0094
													0.034	0.075

n/a - not applicable

g/sec Conversion: 3600   sec/hr   divided by   453.5924 g/lb = lb/hr

1 All UTM source coordinates shown are in NAD 83.

2 Release heights for volume sources were based on the estimated height of the material handling activities.

3 Sigma y values for material handling volume sources were calculated by dividing the estimated initial length of the volume source by 4.3, per AERMOD guidance.

4 Sigma z values for material handling volume sources were calculated by dividing the vertical source dimension (estimated as the release height) by 2.15, per AERMOD guidance.

Source Description	Model ID	Source UTM Location[1]		Base Elevation (m)	Stack/ Release Height (m)[2]	Temperature (K)	Flow Rate (ft³/min)	Velocity (m/s)	Diameter (m)	Sigma-y (m)[3]	Sigma-z (m)[4]	Long-Term Emission Rates (g/s)[5]		
		Easting (m)	Northing (m)									Formaldehyde	Arsenic	Cadmium
Volume Sources														
Truck Material Handling	TRUCK	549731.5	4828422.2	797.0	4.6	n/a	n/a	n/a	n/a	0.57	2.13	n/a	n/a	n/a
Front-End Loader Material Handling	FEL	549728.2	4828442.8	797.0	5.0	n/a	n/a	n/a	n/a	0.43	2.33	n/a	n/a	n/a
Feeder Belt Transfer	FB	549728.2	4828447.0	797.0	3.0	n/a	n/a	n/a	n/a	1.77	1.42	n/a	n/a	n/a
Feed Conveyor Transfer	FC	549728.2	4828452.3	797.0	6.1	n/a	n/a	n/a	n/a	1.77	1.42	n/a	n/a	n/a
Point Sources														
Ventilex B.V. Fluid Bed Dryer & Cooler Baghouse	BH1	549735.6	4828466.0	797.0	9.1	477.6	11,000	10.0	0.81	n/a	n/a	n/a	n/a	n/a
Dryer Fugitive Dust Collector Baghouse	BH2	549725.5	4828447.0	797.0	11.6	298.0	15,000	19.1	0.69	n/a	n/a	n/a	n/a	n/a
Plant and Fugitive Dust Collector Baghouse	BH3	549721.4	4828466.6	797.0	9.1	298.0	18,000	16.4	0.81	n/a	n/a	n/a	n/a	3.31E-11
Outside Storage Silo Fugitive Dust Baghouse	BH4	549721.4	4828463.2	797.0	20.1	298.0	508	6.2	0.22	n/a	n/a	n/a	n/a	n/a
Fly Ash Bin Vent Filter No. 1	BH5	549719.4	4828565.6	797.0	26.2	298.0	1,200	24.4	0.17	n/a	n/a	n/a	n/a	9.35E-15
Fly Ash Bin Vent Filter No. 2	BH6	549725.4	4828565.6	797.0	26.2	298.0	1,200	24.4	0.17	n/a	n/a	n/a	n/a	9.35E-15
Fly Ash Bin Vent Filter No. 3	BH7	549731.4	4828565.6	797.0	26.2	298.0	1,200	24.4	0.17	n/a	n/a	n/a	n/a	9.35E-15
Fugitive Fly Ash Baghouse	BH8	549725.4	4828570.6	797.0	7.6	298.0	4,523	33.1	0.29	n/a	n/a	n/a	n/a	3.52E-14
Ventilex Dryer	DRYER	549735.6	4828466.0	797.0	9.1	477.6	11,000	10.0	0.81	n/a	n/a			4.95E-06

n/a - not applicable; TBD - to be determined

1 All UTM source coordinates shown are in NAD 83.

2 Release heights for volume sources were based on the estimated height of the material handling activities.

3 Sigma y values for material handling volume sources were calculated by dividing the estimated initial length of the volume source by 4.3, per AERMOD guidance.

4 Sigma z values for material handling volume sources were calculated by dividing the vertical source dimension (estimated as the release height) by 2.15, per AERMOD guidance.

5 TAPs emission rates were calculated by dividing the maximum pounds per day emission rate by 24 hours, and converting to a g/s value.

DEQ COMMENT on Note 5: This approach is not correct for carcinogenic TAPs subject to an annual standard, which includes formaldehyde, arsenic, and cadmium.

TABLE 2-1
HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO
PROJECTED FACILITY-WIDE ANNUAL CRITERIA POLLUTANT AND HAP EMISSIONS (TONS PER YEAR)[1]
DEQ COMMENTS

EMISSIONS	Dryer	Baghouse Emissions	*TOTAL POINT SOURCE EMISSIONS*	Material Handling Sources[2]	Conveyor Belt Emissions	*TOTAL FUGITIVE EMISSIONS*	TOTAL EMISSIONS
Criteria Pollutants							
CO	4.02	--	4.02	--	--	--	4.02
NOx	2.11	--	2.11	--	--	--	2.11
PM_{10}	0.15	11.30	11.45	0.57	0.69	1.27	12.72
PM	0.15	11.30	11.45	1.22	1.46	2.67	14.12
VOC	0.11	--	0.11	--	--	--	0.11
SO_2	0.01	--	0.01	--	--	--	0.01
Pb	9.85E-06	--	9.85E-06	--	--	--	9.85E-06
HAPs							
Benzene	4.14E-05	--	4.14E-05	--	--	--	4.14E-05
Formaldehyde	1.48E-03	--	1.48E-03	--	--	--	1.48E-03
Hexane	3.55E-02	--	3.55E-02	--	--	--	3.55E-02
Naphthalene	1.20E-05	--	1.20E-05	--	--	--	1.20E-05
Toluene	6.76E-05	--	6.76E-05	--	--	--	6.76E-05
Arsenic	3.94E-06	2.50E-09	3.94E-06	--	--	--	3.94E-06
Beryllium	2.36E-07	1.43E-10	2.37E-07	--	--	--	2.37E-07
Cadmium	2.17E-05	1.45E-10	2.17E-05	--	--	--	2.17E-05
Chromium	2.76E-05	1.94E-09	2.76E-05	--	--	--	2.76E-05
Cobalt	1.66E-06	--	1.66E-06	--	--	--	1.66E-06
Lead	--	1.22E-09	1.22E-09	--	--	--	1.22E-09
Manganese	7.49E-06	1.26E-07	7.61E-06	--	--	--	7.61E-06
Mercury	5.12E-06	--	5.12E-06	--	--	--	5.12E-06
Nickel	4.14E-05	1.42E-08	4.14E-05	--	--	--	4.14E-05
Selenium	4.73E-07	1.06E-10	4.73E-07	--	--	--	4.73E-07
Total HAPs	3.72E-02	1.46E-07	3.72E-02	0.00E+00	0.00E+00	0.00E+00	3.72E-02

1 '--' Emissions of compound are either not present or were not reported in the literature reviewed; 'TBD' To be determined

2 Material handling sources include truck unloading and front-end loader loading.

TABLE 2-2
HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO
PROJECTED FACILITY-WIDE HOURLY CRITERIA POLLUTANT AND HAP EMISSIONS (POUNDS PER HOUR)[1]

EMISSIONS	Dryer	Baghouse Emissions	TOTAL POINT SOURCE EMISSIONS	Material Handling Sources[2]	Conveyor Belt Emissions	TOTAL FUGITIVE EMISSIONS	TOTAL EMISSIONS
Criteria Pollutants							
CO	2.00	--	2.00	--	--	--	2.00
NOx	1.05	--	1.05	--	--	--	1.05
PM_{10}	0.07	5.62	5.70	0.29	0.35	0.63	6.33
PM	0.07	5.62	5.70	0.60	0.73	1.33	7.03
VOC	0.05	--	0.05	--	--	--	0.05
SO_2	0.01	--	0.01	--	--	--	0.01
Pb	4.90E-06	--	4.90E-06	--	--	--	4.90E-06
HAPs							
Benzene	9.45E-06	--	9.45E-06	--	--	--	9.45E-06
Formaldehyde	3.37E-04	--	3.37E-04	--	--	--	3.37E-04
Hexane	1.76E-02	--	1.76E-02	--	--	--	1.76E-02
Naphthalene	5.98E-06	--	5.98E-06	--	--	--	5.98E-06
Toluene	3.36E-05	--	3.36E-05	--	--	--	3.36E-05
Arsenic	9.00E-07	5.72E-10	9.00E-07	--	--	--	9.00E-07
Beryllium	5.40E-08	3.27E-11	5.40E-08	--	--	--	5.40E-08
Cadmium	4.95E-06	3.32E-11	4.95E-06	--	--	--	4.95E-06
Chromium	1.37E-05	9.65E-10	1.37E-05	--	--	--	1.37E-05
Cobalt	8.24E-07	--	8.24E-07	--	--	--	8.24E-07
Lead	--	6.05E-10	6.05E-10	--	--		6.05E-10
Manganese	3.73E-06	6.25E-08	3.79E-06	--	--	--	3.79E-06
Mercury	2.55E-06	--	2.55E-06	--	--	--	2.55E-06
Nickel	9.45E-06	3.25E-09	9.45E-06	--	--	--	9.45E-06
Selenium	2.35E-07	5.26E-11	2.35E-07	--	--	--	2.35E-07
Total HAPs	1.81E-02	6.80E-08	1.81E-02	0.00E+00	0.00E+00	0.00E+00	1.81E-02

1 '--' Emissions of compound are either not present or were not reported in the literature reviewed; 'TBD' To be determined

2 Material handling sources include truck unloading and front-end loader loading.

TABLE 2-3
HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO
PROJECTED FACILITY-WIDE ANNUAL TAP EMISSIONS (TONS PER YEAR)[1]
DEQ COMMENTS

EMISSIONS	Dryer	Baghouse Emissions	TOTAL POINT SOURCE EMISSIONS	Material Handling Sources[2]	Conveyor Belt Emissions	TOTAL FUGITIVE EMISSIONS	TOTAL EMISSIONS
Organic TAPs							
Benzene	4.14E-05	--	4.14E-05	--	--	--	4.14E-05
Benzo(a)pyrene	2.36E-08	--	2.36E-08	--	--	--	2.36E-08
Formaldehyde	1.48E-03	--	1.48E-03	--	--	--	1.48E-03
Hexane	3.55E-02	--	3.55E-02	--	--	--	3.55E-02
3-Methylchloranthrene	3.55E-08	--	3.55E-08	--	--	--	3.55E-08
Naphthalene	1.20E-05	--	1.20E-05	--	--	--	1.20E-05
Pentane	5.12E-02	--	5.12E-02	--	--	--	5.12E-02
Toluene	6.76E-05	--	6.76E-05	--	--	--	6.76E-05
Inorganic TAPs							
Arsenic	3.94E-06	2.50E-09	3.94E-06	--	--	--	3.94E-06
Barium	8.67E-05	--	8.67E-05	--	--	--	8.67E-05
Beryllium	2.36E-07	1.43E-10	2.37E-07	--	--	--	2.37E-07
Cadmium	2.17E-05	1.45E-10	2.17E-05	--	--	--	2.17E-05
Chromium	2.76E-05	1.94E-09	2.76E-05	--	--	--	2.76E-05
Chromium-VI	--	5.66E-10	5.66E-10	--	--	--	5.66E-10
Cobalt	1.66E-06	--	1.66E-06	--	--	--	1.66E-06
Copper	1.68E-05	--	1.68E-05	--	--	--	1.68E-05
Lead	--	1.22E-09	1.22E-09	--	--	--	1.22E-09
Manganese	7.49E-06	1.26E-07	7.61E-06	--	--	--	7.61E-06
Mercury	5.12E-06	--	5.12E-06	--	--	--	5.12E-06
Molybdenum	2.17E-05	--	2.17E-05	--	--	--	2.17E-05
Nickel	4.14E-05	1.42E-08	4.14E-05	--	--	--	4.14E-05
Phosphorus	--	1.25E-08	1.25E-08	--	--	--	1.25E-08
Selenium	4.73E-07	1.06E-10	4.73E-07	--	--	--	4.73E-07
Zinc	5.71E-04	--	5.71E-04	--	--	--	5.71E-04
Total TAPs	**8.85E-02**	**1.59E-07**	**8.85E-02**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**8.85E-02**

1 '--' Emissions of compound are either not present or were not reported in the literature reviewed; 'TBD' To be determined

2 Material handling sources include truck unloading and front-end loader loading.

PTC Fees are based on emissions of HAPs, not TAPs. TAPs present as particulates will have already been counted as part of PM10.

Volatile TAPs from the dryer burner have already been counted as dryer burner VOCs.

TABLE 3-2

HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO

FACILITY-WIDE HOURLY TAP EMISSIONS (POUNDS PER HOUR)[1] - DEQ COMMENTS

DEQ COMMENTS - Carcinogens listed in Section 586 are subject to an annual standard (lb/hr, annual average)

Noncarcinogens are subject to a 24-hr standard (lb/hr, 24-hr average): Winter lb/hr x 9/24, Summer lb/hr x 12/24

EMISSIONS	Dryer	Baghouse Emissions	TOTAL POINT SOURCE EMISSIONS	Material Handling Sources[2]	Conveyor Belt Emissions	TOTAL FUGITIVE EMISSIONS	TOTAL EMISSIONS	EL (lb/hr)	Exceeds EL?
Organic TAPs									
Benzene	9.45E-06	--	9.45E-06	--	--	--	9.45E-06	8.00E-04	--
Benzo(a)pyrene	5.40E-09	--	5.40E-09	--	--	--	5.40E-09	2.00E-06	--
Formaldehyde	3.37E-04	--	3.37E-04	--	--	--	3.37E-04	5.10E-04	--
Hexane	1.76E-02	--	1.76E-02	--	--	--	1.76E-02	12	--
3-Methylchloranthrene	8.10E-09	--	8.10E-09	--	--	--	8.10E-09	2.50E-06	--
Naphthalene	5.98E-06	--	5.98E-06	--	--	--	5.98E-06	3.33	--
Pentane	2.55E-02	--	2.55E-02	--	--	--	2.55E-02	118	--
Toluene	3.36E-05	--	3.36E-05	--	--	--	3.36E-05	25	--
Inorganic TAPs									
Arsenic	9.00E-07	5.72E-10	9.00E-07	--	--	--	9.00E-07	1.50E-06	--
Barium	4.31E-05	--	4.31E-05	--	--	--	4.31E-05	0.033	--
Beryllium	5.40E-08	3.27E-11	5.40E-08	--	--	--	5.40E-08	2.80E-05	--
Cadmium	4.95E-06	3.32E-11	4.95E-06	--	--	--	4.95E-06	3.70E-06	Yes
Chromium	1.37E-05	9.65E-10	1.37E-05	--	--	--	1.37E-05	3.30E-02	--
Chromium-VI	--	1.29E-10	1.29E-10	--	--	--	1.29E-10	5.60E-07	--
Cobalt	8.24E-07	--	8.24E-07	--	--	--	8.24E-07	0.0033	--
Copper	8.33E-06	--	8.33E-06	--	--	--	8.33E-06	0.067	--
Lead - NAAQS ONLY	--	6.05E-10	6.05E-10	--	--	--	6.05E-10	--	--
Manganese	3.73E-06	6.25E-08	3.79E-06	--	--	--	3.79E-06	0.333	--
Mercury	2.55E-06	--	2.55E-06	--	--	--	2.55E-06	0.007	--
Molybdenum	1.08E-05	--	1.08E-05	--	--	--	1.08E-05	0.667	--
Nickel	9.45E-06	3.25E-09	9.45E-06	--	--	--	9.45E-06	2.70E-05	--
Phosphorus	--	6.22E-09	6.22E-09	--	--	--	6.22E-09	0.007	--
Selenium	2.35E-07	5.26E-11	2.35E-07	--	--	--	2.35E-07	0.013	--
Zinc	2.84E-04	--	2.84E-04	--	--	--	2.84E-04	0.667	--
Total TAPs	4.36E-02	7.44E-08	4.36E-02	0.00E+00	0.00E+00	0.00E+00	4.36E-02	--	--

1 '--' Emissions of compound are either not present or were not reported in the literature reviewed; 'TBD' To be determined

2 Material handling sources include truck unloading and front-end loader loading.

TABLE C-1
HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO
TRUCK UNLOADING EMISSIONS - CRITERIA POLLUTANTS - DEQ COMMENTS

Emission Source:	SAND AND GRAVEL TRUCK - UNLOADING
Pollutants:	PM_{10} and PM

Emission Factor From: AP-42, Section 13.2.4
"Aggregate Handling and Storage Piles"

Emission Factor Rating: A

Explanation: Trucks deliver sand and gravel to the storage yard on the northern portion of the property, where the raw material is off-loaded into storage piles. A total emission value is calculated by determining the amount of sand and gravel to be unloaded, and calculating an emission factor based on the characteristics and amount of material to be handled and the mean wind speed. Emissions of PM for truck unloading at the surface are calculated by using the predictive emission equation specified in Section 13.2.4, Equation (1) in units of pounds per ton of material processed in a batch drop operation. This equation states that emissions of PM can be calculated by multiplying the aerodynamic particle size multiplier provided in the text by 0.0032. This result is multiplied by the mean wind speed divided by 5 and raised to the power of 1.3, with this quantity divided by the quantity of the material moisture content divided by 2 and raised to the power of 1.4. The product of the multiplication specified by Equation (1) is the emission factor in pounds per ton of material processed in a batch drop operation.

Emission Equations: $E = k*0.0032 *[((U/5)^{1.3})/((M/2)^{1.4})]$

Where:
- E = emission factor (lbs/ton)
- k = aerodynamic particle size multiplier (unitless)
- U = mean wind speed (mph)
- M = material moisture content (%)

Data:

$k (PM_{10})$ =	0.35	multiplier for PM_{10}
$k (PM)$ =	0.74	multiplier for PM
U =	8.70 mph	[mean wind speed in Boise, ID (http://www.wrcc.dri.edu/cgi-bin/clilcd.pl?id24131)]
M_{sand} =	4.17 %	[mean moisture content as per AP 42 11.12]
M_{gravel} =	1.77 %	[mean moisture content as per AP 42 11.12]

$E_{sand} (PM_{10})$ =	8.23E-04	lbs/ton
$E_{sand} (PM)$ =	1.74E-03	lbs/ton
$E_{gravel} (PM_{10})$ =	2.73E-03	lbs/ton
$E_{gravel} (PM)$ =	5.77E-03	lbs/ton

Annual PM emissions (tons/yr) = E * F * (ton/2000 lbs)
Short-term PM emissions (lbs/hr) = E * F / H

Where:
- F = annual feed rate (tons/yr)
- H = working hours per year (hrs/yr)

Data: H = 4020 hrs/yr

Proposed Operations are 4,020 hr/yr, not 8760. Using 8760 underpredicts ST emissions by ~46% Even at 4020, this approach may underpredict these emissions, since it's unlikely that sand/gravel. are delivered at the same rate each day.

Emissions Estimate:

Material Handling	F (tons/yr)	PM₁₀ Emissions		PM Emissions	
		(tons/yr)	(lbs/hr)	(tons/yr)	(lbs/hr)
Sand Unloading	262,800	0.11	0.05	0.23	0.11
Gravel Unloading	131,400	0.18	0.09	0.38	0.19
Total Emissions		0.29	0.14	0.61	0.30

LT ER (g/s)	ST ER (g/s)
0.008269671	0.018020478

Release Height	15	ft
	4.6	m
Sigma y	0.567069767	m
Sigma z	2.1	m
Base Elevation	2614	feet
	797.0	m

Emission Source:	FRONT-END LOADER - LOADING AND UNLOADING
Pollutants:	PM_{10} and PM
Emission Factor From:	AP-42, Section 13.2.4
	"Aggregate Handling and Storage Piles"
Emission Factor Rating:	A

Explanation:

A front-end loader is used to move sand and gravel from the stockpiles into the hoppers.
A total emission value is calculated by determining the amount of sand and gravel to be loaded into the hoppers.
Emissions of PM from material handling are calculated by using the predictive emission equation
specified in Section 13.2.4, Equation (1) in units of pounds per ton of material processed in a batch drop operation.
This equation states that emissions of PM can be calculated by multiplying the aerodynamic particle size multiplier provided in
the text by 0.0032. This result is multiplied by the quantity of the mean wind speed divided by 5 and raised to the
power of 1.3, with this quantity divided by the quantity of the material moisture content divided by 2 and
raised to the power of 1.4. The product of the multiplication specified by Equation (1) is the emission
factor in pounds per ton of material processed in a batch drop operation.

Emission Equations:

$$E = k*0.0032 *[((U/5)^{1.3})/((M/2)^{1.4})]$$

Where:

E = emission factor (lbs/ton)
k = Aerodynamic Particle Size Multiplier (unitless)
U = mean wind speed (mph)
M = material moisture content (%)

Data:

$k (PM_{10})$ =	0.35	multiplier for PM_{10}
$k (PM)$ =	0.74	multiplier for PM
U =	8.70 mph	[mean wind speed in Boise, ID (http://www.wrcc.dri.edu/cgi-bin/clilcd.pl?id24131)]
M_{sand} =	4.17 %	[mean moisture content as per AP 42 11.12]
M_{gravel} =	1.77 %	[mean moisture content as per AP 42 11.12]

$E_{sand} (PM_{10})$ =	8.23E-04	lbs/ton
$E_{sand} (PM)$ =	1.74E-03	lbs/ton
$E_{gravel} (PM_{10})$ =	2.73E-03	lbs/ton
$E_{gravel} (PM)$ =	5.77E-03	lbs/ton

Annual PM emissions (tons/yr) = E * F * (ton/2000 lbs)
Short-term PM emissions (lbs/hr) = E * F / H

Where:

F = annual feed rate (tons/yr)
H = working hours per year (hrs/yr)

Data:

H = 4020	hrs/yr	Proposed Operations are 4,020 hr/yr, not 8760. Using 8760 underpredicts ST emissions by ~46%

Emissions Estimate:

Material Handling	F (tons/yr)	PM_{10} Emissions		PM Emissions	
		(tons/yr)	(lbs/hr)	(tons/yr)	(lbs/hr)
Sand Unloading	262,800	0.11	0.05	0.23	0.11
Gravel Unloading	131,400	0.18	0.09	0.38	0.19
Total Emissions		0.29	0.14	0.61	0.30

LT ER (g/s)	ST ER (g/s)
0.008269671	0.018020478

Release Height	5.0 m
Sigma y	0.425302326 m
Sigma z	2.3 m
Base Elevation	2614 feet
	797.0 m

Emission Source:	**FEED CONVEYOR TRANSFER**
Pollutants:	PM_{10} **and PM**
Emission Factor From:	**AP-42, Section 11.12**
	"Concrete Batching"
Emission Factor Rating:	**D**

Explanation: Sand and gravel are transferred from the wet hoppers to a feeder belt, which transfers the material onto
a feed conveyor. A total emission value is calculated by determining the amount of sand and gravel to be conveyed.
Emissions of PM from transfer points are calculated by using the predictive emission factor
specified in Section 11.12, in units of pounds per ton of material conveyed.

Emission Equations: **Annual PM emissions (tons/yr) = E * F * N * (ton/2000 lbs)**

Short-term PM emissions (lbs/hr) = E * F * N / H

Where:
E = emission factor (lbs/ton)
F = material feed rate (tons/yr)
H = working hours per year (hrs/yr)
N = number of transfer points (unitless)

Data:

$E_{sand}(PM_{10})$ =	0.00099	lbs/ton
$E_{sand}(PM)$ =	0.00210	lbs/ton
$E_{gravel}(PM_{10})$ =	0.00330	lbs/ton
$E_{gravel}(PM)$ =	0.00690	lbs/ton
H =	4020	hrs/yr
N=	2	(unitless)

Emissions Estimate: Proposed Operations are 4,020 hr/yr, not 8760. Using 8760 underpredicts ST emissions by ~46%

Material Handling	F (tons/yr)	PM_{10} Emissions		PM Emissions	
		(tons/yr)	(lbs/hr)	(tons/yr)	(lbs/hr)
Sand Unloading	262,800	0.26	0.13	0.55	0.27
Gravel Unloading	131,400	0.43	0.22	0.91	0.45
Total Emissions		0.69	0.35	1.46	0.73

	LT ER (g/s)	ST ER (g/s)
Transfer 1	0.0099792	0.021745719
Transfer 2	0.0099792	0.021745719

Release Height (FB)	10	ft
	3.0	m
Release Height (FC)	20	ft
	6.1	m
Sigma y	1.772093023	m
Sigma z	1.4	m
Base Elevation	2614	feet
	797.0	m

Emission Source: Ventilex B.V. Fluid Bed Dryer & Cooler Baghouse
Pollutants: PM_{10} and PM

Emission Factor From: Manufacturer's Guarantee - Ventilex Baghouse Model No. 150-3500-192

Explanation: Emissions from the sand and gravel drying and cooling process in the Ventilex Fluid Bed Dryer & Cooler are vented through this baghouse. Emissions are calculated by multiplying the baghouse emission factor by the maximum flow ratin of the baghouse.

Emission Equations: Short-term PM emissions (lbs/hr) = E (mg/m³) * Q (ft³/min) * (60 min/hr) * (m³/3.28 ft³) * (g/1000 mg) * (lb/453.6 g)

Annual PM emissions (tons/yr) = Short-term PM emissions (lbs/hr) * H * (ton/2000 lbs)

Where:

E = emission factor (mg/m^3)
Q = baghouse flow rate (ft^3/min)
H = working hours per year (hrs/yr)

Data:

$E =$	10	mg/m^3
$Q =$	11000	ft^3/min
$H =$	4020	hrs/yr

Proposed Operations are 4,020 hr/yr, not 8760. Using 8760 for this source overpredicts LT emissions by ~46%

Emissions Estimate:

PM_{10} Emissions		PM Emissions	
(tons/yr)	(lbs/hr)	(tons/yr)	(lbs/hr)
0.83	0.41	0.83	0.41

LT ER (g/s)   ST ER (g/s)
     0.023841954   0.051954109

Flow Rate	11000	ft3/min
Stack height	30	feet
	9.1	m
Stack Area		ft2
		m2
Equivalent Diameter	0.81	m
Temperature	477.5944444	K
Velocity	10.0	m/s
Base Elevation	2614	feet
	797.0	m

TABLE C-5

HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO
DRYER BAGHOUSE EMISSIONS - CRITERIA POLLUTANTS - DEQ COMMENTS

Emission Source:	Dryer Fugitive Dust Collector Baghouse
Pollutants:	PM_{10} and PM

Emission Factor From: Manufacturer - Carbo Tech Baghouse Model No. 12-12-12-2714-RTH

Communicated by the vendor, Mark Rydalch (801) 363-6736, National Filter Media Corporation, Salt Lake City, UT

Explanation: Fugitive dust emissions from the sand and gravel drying and cooling process in the Ventilex Fluid Bed Dryer & Cooler are vented through this baghouse. Emissions are calculated by multiplying the baghouse emission factor by the maximum flow rating of the baghouse.

Emission Equations: Short-term PM emissions (lbs/hr) = E (gr/dscf) * Q (scf/min) * (60 min/hr) * (lb/7000 gr)

Annual PM emissions (tons/yr) = Short-term PM emissions (lbs/hr) * H * (ton/2000 lbs)

Where:

E = emission factor (gr/dscf)
Q = baghouse flow rate (scf/min)
H = working hours per year (hrs/yr)

Data:

E =	0.005	gr/dscf
Q =	15000	scf/min
H =	4020	hrs/yr
1 m =	3.28084	ft

Emissions Estimate: Proposed Operations are 4,020 hr/yr, not 8760. Using 8760 for this source overpredicts LT emissions by ~46%

PM_{10} Emissions		PM Emissions	
(tons/yr)	(lbs/hr)	(tons/yr)	(lbs/hr)
1.29	0.64	1.29	0.64

Emission Source: Ventilex Dryer

Emission Factor From: AP-42, Section 1.4, "Natural Gas Combustion"
Manufacturer Data

Explanation: Criteria pollutant emissions will result from combustion of natural gas in the Ventilex dryer. Emission calculations are based on specifications from the manufacturer and AP-42 emission factors as noted.

Emission Equations: Hourly Emissions (lbs/hr) = HI (mmBTU/hr) * E (lb/mmBTU)
Hourly Emissions (lbs/hr) = HI (mmBTU/hr) * E (lb/mmscf) * (mmscf/1,020 mmBTU)

Annual Emissions (tons/yr) = Hourly Emissions (lbs/hr) * H * (ton/2000 lbs)

Where: HI = heat input (mmBTU/hr)
E = emission factor
H = working hours per year (hrs/yr)

Data: HI =   10   mmBTU/hr
OH =   4020   hrs/yr

Emissions Estimate: Proposed Operations are 4,020 hr/yr, not 8760. Using 8760 for this source overpredicts LT emissions by ~46%

Pollutant	E	Units	Emission Factor Source	Total Hourly Emissions (lbs/hr)	Total Annual Emissions (tons/yr)
CO	0.200	lb/mmBTU	Manufacturer Data	2.0	4.0
NO$_X$	0.105	lb/mmBTU	Manufacturer Data	1.1	2.1
PM/PM$_{10}$	7.6	lb/mmscf	AP-42 (7/98) Table 1.4-2	0.07	0.15
VOC	5.5	lb/mmscf	AP-42 (7/98) Table 1.4-2	0.05	0.11
SO$_2$	0.6	lb/mmscf	AP-42 (7/98) Table 1.4-2	0.01	0.01
Pb	0.0005	lb/mmscf	AP-42 (7/98) Table 1.4-2	4.90E-06	9.85E-06

	LT ER (g/s)	ST ER (g/s)
CO		0.252
NO$_X$	0.06071301	
PM/PM$_{10}$	0.0043083	0.00938824
VOC		0.00679412
SO$_2$	0.00034013	0.00074118
Pb	2.8344E-07	6.1765E-07

Note:
Maxon burner NOx and CO emissions estimates are based on firing into a Ventilex dryer with 14" wc back pressure, with 100 deg F incoming fresh air and 950 deg F outgoing process air.

Flow Rate	11000	ft3/min
Stack height	30	feet
	9.1	m
Stack Area		ft2
		m2
Equivalent Diameter	0.81	m
Temperature	477.5944444	K
Velocity	10.0	m/s
Base Elevation	2614	feet
	797.0	m

TABLE C-7
HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO
DRYER NATURAL GAS COMBUSTION EMISSIONS - TOXIC POLLUTANTS

DEQ COMMENTS - Carcinogens listed in Section 586 are subject to an annual standard (lb/hr, annual average)
Noncarcinogens are subject to a 24-hr standard (lb/hr, 24-hr average): Winter lb/hr x 9/24, Summer lb/hr x 12/24

Emission Source: **Ventilex Dryer**

Emission Factor From: **AP-42, Section 1.4, "Natural Gas Combustion"**

Explanation: Hazardous air pollutant emissions will result from combustion the Ventilex dryer. Emission calculations are based on specifications from the manufacturer and AP-42 emission factors as noted.

Emission Equations: Hourly Emissions (lbs/hr) = HI (mmBTU/hr) * E (lb/mmscf) * (mmscf/1,020 mmBTU)

Annual Emissions (tons/yr) = Hourly Emissions (lbs/hr) * H * (ton/2000 lbs)

Where: HI = heat input (mmBTU/hr)
           E = emission factor (lb/mmscf)
           H = working hours per year (hrs/yr)

Data: HI =   10   mmBTU/hr
           OH =   4020   hrs/yr

Emissions Estimate: Proposed Operations are 4,020 hr/yr, not 8760. Using 8760 for this source overpredicts LT emissions by ~46%

Pollutant	Emission Factor	Units	Source	Hourly Emissions (lbs/hr)	Annual Emissions (tons/yr)	Chemical Abstract Services (CAS) Number	HAP?	TAP?	9 Noncarcinogen TAPs lb/hr, winter	12 Noncarcinogen TAPs lb/hr, summer
Organic Compounds										
Benzene	2.10E-03	lb/mmscf	AP-42 (7/98) Table 1.4-3	9.45E-06	4.14E-05	71-43-2	Yes	Yes		
Benzo(a)pyrene	1.20E-06	lb/mmscf	AP-42 (7/98) Table 1.4-3	5.40E-09	2.36E-08	50-32-8	No	Yes		
Formaldehyde	7.50E-02	lb/mmscf	AP-42 (7/98) Table 1.4-3	3.37E-04	1.48E-03	50-00-0	Yes	Yes		
Hexane	1.80E+00	lb/mmscf	AP-42 (7/98) Table 1.4-3	1.76E-02	3.55E-02	110-54-3	Yes	Yes	6.62E-03	8.82E-03
3-Methylchloranthrene	1.80E-06	lb/mmscf	AP-42 (7/98) Table 1.4-3	8.10E-09	3.55E-08	56-49-5	No	Yes		
Naphthalene	6.10E-04	lb/mmscf	AP-42 (7/98) Table 1.4-3	5.98E-06	1.20E-05	91-20-3	Yes	Yes	2.24E-06	2.99E-06
Pentane	2.60E+00	lb/mmscf	AP-42 (7/98) Table 1.4-3	2.55E-02	5.12E-02	109-66-0	No	Yes	9.56E-03	1.27E-02
Toluene	3.43E-03	lb/mmscf	AP-42 (7/98) Table 1.4-3	3.36E-05	6.76E-05	108-88-3	Yes	Yes	1.26E-05	1.68E-05
Inorganic Compounds										
Arsenic	2.00E-04	lb/mmscf	AP-42 (7/98) Table 1.4-3	9.00E-07	3.94E-06	7440-38-2	Yes	Yes		
Barium	4.40E-03	lb/mmscf	AP-42 (7/98) Table 1.4-3	4.31E-05	8.67E-05	7440-39-3	No	Yes	1.62E-05	2.16E-05
Beryllium	1.20E-05	lb/mmscf	AP-42 (7/98) Table 1.4-3	5.40E-08	2.36E-07	7440-41-7	Yes	Yes		
Cadmium	1.10E-03	lb/mmscf	AP-42 (7/98) Table 1.4-3	4.95E-06	2.17E-05	7440-43-9	Yes	Yes		
Chromium	1.40E-03	lb/mmscf	AP-42 (7/98) Table 1.4-3	1.37E-05	2.76E-05	7440-47-3	Yes	Yes	5.15E-06	6.86E-06
Cobalt	8.40E-05	lb/mmscf	AP-42 (7/98) Table 1.4-3	8.24E-07	1.66E-06	7440-48-4	Yes	Yes	3.09E-07	4.12E-07
Copper	8.50E-04	lb/mmscf	AP-42 (7/98) Table 1.4-3	8.33E-06	1.68E-05	7440-50-8	No	Yes	3.13E-06	4.17E-06
Manganese	3.80E-04	lb/mmscf	AP-42 (7/98) Table 1.4-3	3.73E-06	7.49E-06	7439-96-5	Yes	Yes	1.40E-06	1.86E-06
Mercury	2.60E-04	lb/mmscf	AP-42 (7/98) Table 1.4-3	2.55E-06	5.12E-06	7439-97-6	Yes	Yes	9.56E-07	1.27E-06
Molybdenum	1.10E-03	lb/mmscf	AP-42 (7/98) Table 1.4-3	1.08E-05	2.17E-05	7439-98-7	No	Yes	4.04E-06	5.39E-06
Nickel	2.10E-03	lb/mmscf	AP-42 (7/98) Table 1.4-3	9.45E-06	4.14E-05	7440-02-0	Yes	Yes		
Selenium	2.40E-05	lb/mmscf	AP-42 (7/98) Table 1.4-3	2.35E-07	4.73E-07	7782-49-2	Yes	Yes	8.82E-08	1.18E-07
Zinc	2.90E-02	lb/mmscf	AP-42 (7/98) Table 1.4-3	2.84E-04	5.71E-04	7440-66-6	No	Yes	1.07E-04	1.42E-04
TOTAL HAPs	--	--	--	1.81E-02	3.72E-02	--	--	--		
TOTAL TAPs	--	--	--	4.39E-02	8.91E-02	--	--	--		

TABLE C-8
HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO
CONCRETE PLANT BAGHOUSE EMISSIONS - CRITERIA POLLUTANTS
DEQ COMMENTS

Emission Source: Plant and Fugitive Dust Collector Baghouse

Pollutants: PM_{10} and PM

Emission Factor From: Manufacturer Guarantee - IAC Systems, Inc. Baghouse Model No. 120TB-BHT-196-Style 3

Explanation: Concrete plant fugitive dust emissions are vented through this baghouse. This baghouse controls emissions from the dry conveyor belts and transfer points in the concrete plant, raw cement handling and transfer to the silo in the concrete plant, the material classifier, and the bucket elevators.
Emissions are calculated by multiplying the baghouse emission factor by the maximum flow rating of the baghouse.

Emission Equations: Short-term PM emissions (lbs/hr) = E (gr/dscf) * Q (scf/min) * (60 min/hr) * (lb/7000 gr)

Annual PM emissions (tons/yr) = Short-term PM emissions (lbs/hr) * H * (ton/2000 lbs)

Where:
E = emission factor (gr/dscf)
Q = baghouse flow rate (scf/min)
H = working hours per year (hrs/yr)

Data:
E = 0.020 gr/dscf
Q = 18000 scf/min
H = 4020 hrs/yr

Proposed Operations are 4,020 hr/yr, not 8760. Using 8760 for this source overpredicts LT emissions by ~46%

Emissions Estimate:

PM_{10} Emissions		PM Emissions	
(tons/yr)	(lbs/hr)	(tons/yr)	(lbs/hr)
6.20	3.09	6.20	3.09

PM10

LT ER (g/s)	ST ER (g/s)
0.178421918	0.3888

Flow Rate	18000 ft3/min
Stack height	30 feet
	9.1 m
Stack Area	-- ft2
	-- m2
Equivalent Diameter	0.81 m
Temperature	298 K
Velocity	16.4 m/s
Base Elevation	2614 feet
	797.0 m

TABLE C-9

HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO
CONCRETE PLANT BAGHOUSE EMISSIONS - TOXIC POLLUTANTS

DEQ COMMENTS - Carcinogens listed in Section 586 DEQ COMMENTS - Carcinogens listed in Section 586 are subject to an annual standard (lb/hr, annual average)
Noncarcinogens are subject to a 24-hr standard (lb/hr, 24-hr average): Winter lb/hr x 9/24, Summer lb/hr x 12/24

Emission Source:	Plant and Fugitive Dust Collector Baghouse
Pollutants:	TAPs and HAPs

Emission Factor From: Manufacturer Guarantee - IAC Systems, Inc. Baghouse Model No. 120TB-BHT-196-Style 3

Explanation: Concrete plant fugitive dust emissions are vented through this baghouse. This baghouse controls emissions from the dry conveyor
belts and transfer points in the concrete plant, raw cement handling and transfer to the silo in the concrete plant,
the material classifier, and the bucket elevators.
Total PM emissions from this baghouse are comprised of approximately 20% cement and 2% fly ash.

Emissions Estimate:

									9	12
Pollutant	% in Fly Ash[2]	% in Cement[2]	Source	Hourly Emissions (lbs/hr)	Annual Emissions (tons/yr)	Chemical Abstract Services (CAS) Number	HAP?	TAP?	Noncarcinogen TAPs lb/hr, winter	Noncarcinogen TAPs lb/hr, summer
Arsenic	0.0000000500%	0.0000000840%	AP-42 (6/06) Table 11.12-8	2.52E-10	1.10E-09	7440-38-2	Yes	Yes		
Beryllium	0.0000000045%	0.0000000009%	AP-42 (6/06) Table 11.12-8	3.81E-12	1.67E-11	7440-41-7	Yes	Yes		
Cadmium	0.0000000000%	0.0000000117%	AP-42 (6/06) Table 11.12-8	3.31E-11	1.45E-10	7440-43-9	Yes	Yes		
Chromium -24 hr	0.0000000610%	0.0000000126%	AP-42 (6/06) Table 11.12-8	1.15E-10	2.32E-10	7440-47-3	Yes	Yes	4.33E-11	5.77E-11
Chromium-VI[1]	0.0000000183%	0.0000000025%	IDEQ	1.23E-11	5.40E-11	7440-47-3	No	Yes		
Lead - NAAQS	0.0000000260%	0.0000000368%	AP-42 (6/06) Table 11.12-8	2.43E-10	4.89E-10	75-74-1	Yes	No	9.12E-11	1.22E-10
Manganese - 24 hr	0.0000000128%	0.0000101000%	AP-42 (6/06) Table 11.12-8	6.23E-08	1.25E-07	7439-96-5	Yes	Yes	2.34E-08	3.12E-08
Nickel	0.0000001140%	0.0000008800%	AP-42 (6/06) Table 11.12-8	2.52E-09	1.11E-08	7440-02-0	Yes	Yes		
Phosphorus - 24 hr	0.0000001770%	0.0000005900%	AP-42 (6/06) Table 11.12-8	3.75E-09	7.54E-09	7723-14-0	No	Yes	1.41E-09	1.88E-09
Selenium - 24 hr	0.0000000036%	0.0000000000%	AP-42 (6/06) Table 11.12-8	2.23E-12	4.49E-12	7782-49-2	Yes	Yes	8.38E-13	1.12E-12
TOTAL HAPs	--		--	6.55E-08	1.38E-07	--	--	--		
TOTAL TAPs	--		--	6.90E-08	1.45E-07	--	--	--		

1 Chromium-VI makes up 30% of total chromium in fly ash and 20% of total chromium in cement, per IDEQ.
2 Emission percentages were calculated by converting the AP 42 emission factors for uncontrolled emissions to a ppm value, then to a percent.

% Cr-VI$_{fly ash}$ =	30%	[from IDEQ]
% Cr-VI$_{cement}$ =	20%	[from IDEQ]

	lb/hr	tpy
% PM from fly ash	0.061714286	0.124045714
% PM from cement	0.617142857	1.240457143

% PM from fly ash 3.09 lb/hr x 10,512 T/yr flyash used for conc production /(525,600 T/yr total concrete production)
% PM from cement 3.09 lb/hr x 105,120 T/yr cement used for concrete production /(525,600 T/yr total concrete production)

TABLE C-10
HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO
SAND AND AGGREGATE SILO BAGHOUSE EMISSIONS - CRITERIA POLLUTANTS - DEQ COMMENTS

Emission Source:	Outside Storage Silo Fugitive Dust Baghouse
Pollutants:	PM_{10} and PM

Emission Factor From: Manufacturer Guarantee MikroPul Baghouse Model No. B.V.-30

Explanation: Fugitive dust emissions from the white silo in the concrete plant, also known as the outside sand silo, are vented through this baghouse. Emissions are calculated by multiplying the baghouse emission factor by the maximum flow rating of the baghouse.

Emission Equations:

Short-term PM emissions (lbs/hr) = E (gr/dscf) * Q (scf/min) * (60 min/hr) * (lb/7000 gr)

Annual PM emissions (tons/yr) = Short-term PM emissions (lbs/hr) * H * (ton/2000 lbs)

Where:

E = emission factor (gr/dscf)
Q = baghouse flow rate (scf/min)
H = working hours per year (hrs/yr)

Data:

E =	0.020	gr/dscf
Q =	508	scf/min
H =	4020	hrs/yr
1 m =	3.28084	ft

Emissions Estimate: Proposed Operations are 4,020 hr/yr, not 8760. Using 8760 for this source overpredicts LT emissions by ~46%

PM_{10} Emissions		PM Emissions	
(tons/yr)	(lbs/hr)	(tons/yr)	(lbs/hr)
0.18	0.09	0.18	0.09

LT ER (g/s)	ST ER (g/s)
0.005035463	0.0109728

Flow Rate	508	ft3/min
Stack height	66	feet
	20.1	m
Stack Area	0.417	ft2
	0.039	m2
Equivalent Diameter	0.22	m
Temperature	298	K
Velocity	6.2	m/s
Base Elevation	2614	feet
	797.0	m

Emission Source:	Fly Ash Bin Vent Filter No. 1 in the Track Loadout System
Pollutants:	PM_{10} and PM

Emission Factor From:	Manufacturer Guarantee IAC Systems, Inc. Baghouse Model No. 84TB-BVI-16 Style 2

Explanation: Fugitive dust emissions from the Track Loadout System fly ash bin vent filter No. 1 are vented through this baghouse. Emissions are calculated by multiplying the baghouse emission factor by the maximum flow rating of the baghouse.

Emission Equations: Short-term PM emissions (lbs/hr) = E (gr/dscf) * Q (scf/min) * (60 min/hr) * (lb/7000 gr)

Annual PM emissions (tons/yr) = Short-term PM emissions (lbs/hr) * H * (ton/2000 lbs)

Where: E = emission factor (gr/dscf)
Q = baghouse flow rate (scf/min)
H = working hours per year (hrs/yr)

Data:

E =	0.020	gr/dscf
Q =	1200	scf/min
H =	4020	hrs/yr
1 m =	3.28084	ft

Emissions Estimate: Proposed Operations are 4,020 hr/yr, not 8760. Using 8760 for this source overpredicts LT emissions by ~46%

PM_{10} Emissions		PM Emissions	
(tons/yr)	(lbs/hr)	(tons/yr)	(lbs/hr)
0.41	0.21	0.41	0.21

PM10

LT ER (g/s)	ST ER (g/s)
0.011894795	0.02592

Flow Rate	1200 ft3/min
Stack height	86 feet
	26.2 m
Stack Area	0.25 ft2
	0.023 m2
Equivalent Diameter	0.17 m
Temperature	298 K
Velocity	24.4 m/s
Base Elevation	2614 feet
	797.0 m

TABLE C-12
HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO
FLY ASH BIN VENT BAGHOUSE EMISSIONS - TOXIC POLLUTANTS

DEQ COMMENTS - Carcinogens listed in Section 586 are subject to an annual standard (lb/hr, annual average)
Noncarcinogens are subject to a 24-hr standard (lb/hr, 24-hr average): Winter lb/hr x 9/24, Summer lb/hr x 12/24

Emission Source:	Fly Ash Bin Vent Filter No. 1 in the Track Loadout System
Pollutants:	TAPs and HAPs
Emission Factor From:	Manufacturer Guarantee IAC Systems, Inc. Baghouse Model No. 84TB-BVI-16 Style 2

Explanation: Fugitive dust emissions from the Track Loadout System fly ash bin vent filter No. 1 are vented through this baghouse. Emissions are calculated as a percentage of total PM emissions from this baghouse.

Emissions Estimate:

Pollutant	% in Fly Ash	Source	Hourly Emissions (lbs/hr)	Annual Emissions (tons/yr)	Chemical Abstract Services (CAS) Number	HAP?	TAP?	9 Noncarcinogen TAPs lb/hr, winter	12 Noncarcinogen TAPs lb/hr, summer
Arsenic	0.0000000500%	AP-42 (6/06) Table 11.12-8	4.72E-11	2.07E-10	7440-38-2	Yes	Yes		
Beryllium	0.0000000045%	AP-42 (6/06) Table 11.12-8	4.27E-12	1.87E-11	7440-41-7	Yes	Yes		
Cadmium	0.0000000000%	AP-42 (6/06) Table 11.12-8	9.35E-15	4.09E-14	7440-43-9	Yes	Yes		
Chromium -24 hr	0.0000000610%	AP-42 (6/06) Table 11.12-8	1.25E-10	2.52E-10	7440-47-3	Yes	Yes	4.71E-11	6.27E-11
Chromium-VI[1]	0.0000000183%	IDEQ	1.73E-11	7.57E-11	7440-47-3	No	Yes[1]		
Lead - NAAQS	0.0000000260%	AP-42 (6/06) Table 11.12-8	5.35E-11	1.08E-10	75-74-1	Yes	No	2.01E-11	2.67E-11
Manganese -24 hr	0.0000000128%	AP-42 (6/06) Table 11.12-8	2.63E-11	5.29E-11	7439-96-5	Yes	Yes	9.87E-12	1.32E-11
Nickel	0.0000001140%	AP-42 (6/06) Table 11.12-8	1.08E-10	4.71E-10	7440-02-0	Yes	Yes		
Phosphorus -24 hr	0.0000001770%	AP-42 (6/06) Table 11.12-8	3.64E-10	7.32E-10	7723-14-0	No	Yes	1.37E-10	1.82E-10
Selenium -24 hr	0.0000000036%	AP-42 (6/06) Table 11.12-8	7.45E-12	1.50E-11	7782-49-2	Yes	Yes	2.79E-12	3.72E-12
TOTAL HAPs	--	--	**3.72E-10**	**1.12E-09**	--	--	--		
TOTAL TAPs	--	--	**7.00E-10**	**1.82E-09**	--	--	--		

1 Chromium-VI makes up 30% of total chromium in fly ash, per IDEQ.

$\%~Cr\text{-}VI_{fly~ash} =$ 30%   [from IDEQ]

TABLE C-13
HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO
FLY ASH BIN VENT BAGHOUSE EMISSIONS - CRITERIA POLLUTANTS - DEQ COMMENTS

Emission Source: Fly Ash Bin Vent Filter No. 2 in the Track Loadout System
Pollutants: PM_{10} and PM

Emission Factor From: Manufacturer Guarantee IAC Systems, Inc. Baghouse Model No. 84TB-BVI-16 Style 2

Explanation: Fugitive dust emissions from the Track Loadout System fly ash bin vent filter No. 2 are vented through this baghouse. Emissions are calculated by multiplying the baghouse emission factor by the maximum flow rating of the baghouse.

Emission Equations: Short-term PM emissions (lbs/hr) = E (gr/dscf) * Q (scf/min) * (60 min/hr) * (lb/7000 gr)

Annual PM emissions (tons/yr) = Short-term PM emissions (lbs/hr) * H * (ton/2000 lbs)

Where:
E = emission factor (gr/dscf)
Q = baghouse flow rate (scf/min)
H = working hours per year (hrs/yr)

Data:

E =	0.020	gr/dscf
Q =	1200	scf/min
H =	4020	hrs/yr
1 m =	3.28084	ft

Emissions Estimate: Proposed Operations are 4,020 hr/yr, not 8760. Using 8760 for this source overpredicts LT emissions by ~46%

PM_{10} Emissions		PM Emissions	
(tons/yr)	(lbs/hr)	(tons/yr)	(lbs/hr)
0.41	0.21	0.41	0.21

TABLE C-14
HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO
FLY ASH BIN VENT BAGHOUSE EMISSIONS - TOXIC POLLUTANTS

DEQ COMMENTS - Carcinogens listed in Section 586 are subject to an annual standard (lb/hr, annual average)

Noncarcinogens are subject to a 24-hr standard (lb/hr, 24-hr average): Winter lb/hr x 9/24, Summer lb/hr x 12/24

Emission Source: Fly Ash Bin Vent Filter No. 2 in the Track Loadout System

Pollutants: TAPs and HAPs

Emission Factor From: Manufacturer Guarantee IAC Systems, Inc. Baghouse Model No. 84TB-BVI-16 Style 2

Explanation: Fugitive dust emissions from the Track Loadout System fly ash bin vent filter No. 2 are vented through this baghouse. Emissions are calculated as a percentage of total PM emissions from this baghouse.

Emissions Estimate:

Pollutant	% in Fly Ash	Source	Hourly Emissions (lbs/hr)	Annual Emissions (tons/yr)	Chemical Abstract Services (CAS) Number	HAP?	TAP?	Noncarcinogen TAPs lb/hr, winter (9)	Noncarcinogen TAPs lb/hr, summer (12)
Arsenic	0.0000000500%	AP-42 (6/06) Table 11.12-8	4.72E-11	2.07E-10	7440-38-2	Yes	Yes		
Beryllium	0.0000000045%	AP-42 (6/06) Table 11.12-8	4.27E-12	1.87E-11	7440-41-7	Yes	Yes		
Cadmium	0.0000000000%	AP-42 (6/06) Table 11.12-8	9.35E-15	4.09E-14	7440-43-9	Yes	Yes		
Chromium - 24 hr	0.0000000610%	AP-42 (6/06) Table 11.12-8	1.25E-10	2.52E-10	7440-47-3	Yes	Yes	4.71E-11	6.27E-11
Chromium-VI[1]	0.0000000183%	IDEQ	1.73E-11	7.57E-11	7440-47-3	No	Yes[1]		
Lead - NAAQS	0.0000000260%	AP-42 (6/06) Table 11.12-8	5.35E-11	1.08E-10	75-74-1	Yes	No	2.01E-11	2.67E-11
Manganese -24 hr	0.0000000128%	AP-42 (6/06) Table 11.12-8	2.63E-11	5.29E-11	7439-96-5	Yes	Yes	9.87E-12	1.32E-11
Nickel	0.0000001140%	AP-42 (6/06) Table 11.12-8	1.08E-10	4.71E-10	7440-02-0	Yes	Yes		
Phosphorus - 24 hr	0.0000001770%	AP-42 (6/06) Table 11.12-8	3.64E-10	7.32E-10	7723-14-0	No	Yes	1.37E-10	1.82E-10
Selenium - 24 hr	0.0000000036%	AP-42 (6/06) Table 11.12-8	7.45E-12	1.50E-11	7782-49-2	Yes	Yes	2.79E-12	3.72E-12
TOTAL HAPs	--	--	**3.72E-10**	**1.12E-09**	--	--	--		
TOTAL TAPs	--	--	**7.00E-10**	**1.82E-09**	--	--	--		

1 Chromium-VI makes up 30% of total chromium in fly ash, per IDEQ.

$$\% \ Cr\text{-}VI_{fly\,ash} = \quad 30\% \quad [\text{from IDEQ}]$$

TABLE C-15
HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO
FLY ASH BIN VENT BAGHOUSE EMISSIONS - CRITERIA POLLUTANTS - DEQ COMMENTS

Emission Source:	**Fly Ash Bin Vent Filter No. 3 in the Track Loadout System**
Pollutants:	**PM_{10} and PM**

Emission Factor From: **Manufacturer Guarantee IAC Systems, Inc. Baghouse Model No. 84TB-BVI-16 Style 2**

Explanation: Fugitive dust emissions from the Track Loadout System fly ash bin vent filter No. 3 are vented through this baghouse. Emissions are calculated by multiplying the baghouse emission factor by the maximum flow rating of the baghouse.

Emission Equations: Short-term PM emissions (lbs/hr) = E (gr/dscf) * Q (scf/min) * (60 min/hr) * (lb/7000 gr)

Annual PM emissions (tons/yr) = Short-term PM emissions (lbs/hr) * H * (ton/2000 lbs)

Where:

E = emission factor (gr/dscf)

Q = baghouse flow rate (scf/min)

H = working hours per year (hrs/yr)

Data:

E =	0.020	gr/dscf
Q =	1200	scf/min
H =	4020	hrs/yr
1 m =	3.28084	ft

Emissions Estimate: Proposed Operations are 4,020 hr/yr, not 8760. Using 8760 for this source overpredicts LT emissions by ~46%

PM_{10} Emissions		PM Emissions	
(tons/yr)	(lbs/hr)	(tons/yr)	(lbs/hr)
0.41	0.21	0.41	0.21

TABLE C-16
HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO
FLY ASH BIN VENT BAGHOUSE EMISSIONS - TOXIC POLLUTANTS - DEQ COMMENTS

DEQ COMMENTS - Carcinogens listed in Section 586 are subject to an annual standard (lb/hr, annual average)
Noncarcinogens are subject to a 24-hr standard (lb/hr, 24-hr average): Winter lb/hr x 9/24, Summer lb/hr x 12/24

Emission Source:	Fly Ash Bin Vent Filter No. 3 in the Track Loadout System
Pollutants:	TAPs and HAPs
Emission Factor From:	Manufacturer Guarantee IAC Systems, Inc. Baghouse Model No. 84TB-BVI-16 Style 2

Explanation: Fugitive dust emissions from the Track Loadout System fly ash bin vent filter No. 3 are vented through this baghouse. Emissions are calculated as a percentage of total PM emissions from this baghouse.

Emissions Estimate:

Pollutant	% in Fly Ash	Source	Hourly Emissions (lbs/hr)	Annual Emissions (tons/yr)	Chemical Abstract Services (CAS) Number	HAP?	TAP?	Noncarcinogen TAPs lb/hr, winter (9)	Noncarcinogen TAPs lb/hr, summer (12)
Arsenic	0.0000000500%	AP-42 (6/06) Table 11.12-8	4.72E-11	2.07E-10	7440-38-2	Yes	Yes		
Beryllium	0.0000000045%	AP-42 (6/06) Table 11.12-8	4.27E-12	1.87E-11	7440-41-7	Yes	Yes		
Cadmium	0.0000000000%	AP-42 (6/06) Table 11.12-8	9.35E-15	4.09E-14	7440-43-9	Yes	Yes		
Chromium -24 hr	0.0000000610%	AP-42 (6/06) Table 11.12-8	1.25E-10	2.52E-10	7440-47-3	Yes	Yes	4.71E-11	6.27E-11
Chromium-VI[1]	0.0000000183%	IDEQ	1.73E-11	7.57E-11	7440-47-3	No	Yes		
Lead - NAAQS	0.0000000260%	AP-42 (6/06) Table 11.12-8	5.35E-11	1.08E-10	75-74-1	Yes	No	2.01E-11	2.67E-11
Manganese - 24 hr	0.0000000128%	AP-42 (6/06) Table 11.12-8	2.63E-11	5.29E-11	7439-96-5	Yes	Yes	9.87E-12	1.32E-11
Nickel	0.0000001140%	AP-42 (6/06) Table 11.12-8	1.08E-10	4.71E-10	7440-02-0	Yes	Yes		
Phosphorus - 24 hr	0.0000001770%	AP-42 (6/06) Table 11.12-8	3.64E-10	7.32E-10	7723-14-0	No	Yes	1.37E-10	1.82E-10
Selenium - 24 hr	0.0000000036%	AP-42 (6/06) Table 11.12-8	7.45E-12	1.50E-11	7782-49-2	Yes	Yes	2.79E-12	3.72E-12
TOTAL HAPs	--	--	**3.72E-10**	**1.12E-09**	--	--	--		
TOTAL TAPs	--	--	**7.00E-10**	**1.82E-09**	--	--	--		

1 Chromium-VI makes up 30% of total chromium in fly ash, per IDEQ.

$\% \ Cr\text{-}VI_{fly\ ash} =$ 30%   [from IDEQ]

TABLE C-17
HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO
FLY ASH BIN VENT BAGHOUSE EMISSIONS - CRITERIA POLLUTANTS - DEQ COMMENTS

Emission Source:	**Track Loadout System - Dry Conveyor Transfer with Fugitive Fly Ash through Baghouse**
Pollutants:	PM_{10} **and PM**

Emission Factor From: **Manufacturer Guarantee Mikropul Baghouse Model No. 64S-10-20-C**

Explanation: Fugitive fly ash emissions from the track loadout system are vented through this baghouse.
Emissions are calculated by multiplying the baghouse emission factor by the maximum flow rating of the baghouse.

Emission Equations: **Short-term PM emissions (lbs/hr) = E (gr/dscf) * Q (scf/min) * (60 min/hr) * (lb/7000 gr)**

Annual PM emissions (tons/yr) = Short-term PM emissions (lbs/hr) * H * (ton/2000 lbs)

Where: E = emission factor (gr/dscf)
Q = baghouse flow rate (scf/min)
H = working hours per year (hrs/yr)

Data: E =   0.020   gr/dscf
Q =   4523   scf/min
H =   4020   hrs/yr
1 m =   3.28084   ft

Emissions Estimate: Proposed Operations are 4,020 hr/yr, not 8760. Using 8760 for this source overpredicts LT emissions by ~46%

PM_{10} Emissions		PM Emissions	
(tons/yr)	(lbs/hr)	(tons/yr)	(lbs/hr)
1.56	0.78	1.56	0.78

TABLE C-18

HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO
FLY ASH BIN VENT BAGHOUSE EMISSIONS - TOXIC POLLUTANTS

DEQ COMMENTS - Carcinogens listed in Section 586 are subject to an annual standard (lb/hr, annual average)
Noncarcinogens are subject to a 24-hr standard (lb/hr, 24-hr average): Winter lb/hr x 9/24, Summer lb/hr x 12/24

Emission Source:	Track Loadout System - Dry Conveyor Transfer with Fugitive Fly Ash through Baghouse
Pollutants:	TAPs and HAPs

Emission Factor From: Manufacturer Guarantee Mikropul Baghouse Model No. 64S-10-20-C

Explanation: Fugitive fly ash emissions from the track loadout system are vented through this baghouse.
Emissions are calculated as a percentage of total PM emissions from this baghouse.

Emissions Estimate:

Pollutant	% in Fly Ash	Source	Hourly Emissions (lbs/hr)	Annual Emissions (tons/yr)	Chemical Abstract Services (CAS) Number	HAP?	TAP?	Noncarcinogen TAPs lb/hr, winter (9)	Noncarcinogen TAPs lb/hr, summer (12)
Arsenic	0.0000000500%	AP-42 (6/06) Table 11.12-8	1.78E-10	7.79E-10	7440-38-2	Yes	Yes		
Beryllium	0.0000000045%	AP-42 (6/06) Table 11.12-8	1.61E-11	7.04E-11	7440-41-7	Yes	Yes		
Cadmium	0.0000000000%	AP-42 (6/06) Table 11.12-8	3.52E-14	1.54E-13	7440-43-9	Yes	Yes		
Chromium - 24 hr	0.0000000610%	AP-42 (6/06) Table 11.12-8	4.73E-10	9.51E-10	7440-47-3	Yes	Yes	1.77E-10	2.36E-10
Chromium-VI[1]	0.0000000183%	IDEQ	6.51E-11	2.85E-10	7440-47-3	No	Yes		
Lead - NAAQS	0.0000000260%	AP-42 (6/06) Table 11.12-8	2.02E-10	4.05E-10	75-74-1	Yes	No	7.56E-11	1.01E-10
Manganese - 24 hr	0.0000000128%	AP-42 (6/06) Table 11.12-8	9.92E-11	1.99E-10	7439-96-5	Yes	Yes	3.72E-11	4.96E-11
Nickel	0.0000001140%	AP-42 (6/06) Table 11.12-8	4.06E-10	1.78E-09	7440-02-0	Yes	Yes		
Phosphorus - 24 hr	0.0000001770%	AP-42 (6/06) Table 11.12-8	1.37E-09	2.76E-09	7723-14-0	No	Yes	5.15E-10	6.86E-10
Selenium - 24 hr	0.0000000036%	AP-42 (6/06) Table 11.12-8	2.81E-11	5.64E-11	7782-49-2	Yes	Yes	1.05E-11	1.40E-11
TOTAL HAPs	--	--	**1.40E-09**	**4.24E-09**	--	--	--		
TOTAL TAPs	--	--	**2.64E-09**	**6.88E-09**	--	--	--		

1 Chromium-VI makes up 30% of total chromium in fly ash, per IDEQ.

% Cr-VI$_{fly\ ash}$ =   30%   [from IDEQ]

HANDY TRUCK LINES - MERIDIAN TERMINAL, IDAHO
CONCRETE BATCH PLANT
Summary of Emission Unit Stack Dimensions - DEQ CORRECTIONS

Note: All stacks have baghouses

Stack with Baghouse and Location	Height (feet)		Elevation (feet)	Diameter (inches)		Baghouse Manufacturer
	1 m =	3.28084 ft			d = (2/12)*SQRT ((LxW)/PI())	
Concrete Plant		Height (m)			Dia. (m)	
Plant & Fugitive Dust Collector Baghouse	30'	9.1	2644'	32"	0.81	IAC Systems, Inc.
Dryer Dust Collector Baghouse	30'	9.1	2644'	32"	0.81	Ventilex
White Silo Bin Vent [Outside Sand Silo]	66'	20.1	2680'	5" x 12"	0.22	Mikropul
Dryer Fugitive Dust Collector Baghouse	38'	11.6	2652'	24" x 24"	0.69	Carbo Tech
Track Loadout System						
Bin Vent Fly Ash Baghouse 1	86'	26.2	2700'	6" x 6"	0.17	IAC Systems, Inc.
Bin Vent Fly Ash Baghouse 2	86'	26.2	2700'	6" x 6"	0.17	IAC Systems, Inc.
Bin Vent Fly Ash Baghouse 3	86'	26.2	2700'	6" x 6"	0.17	IAC Systems, Inc.
Fugitive Fly Ash Baghouse [on aerial photo]	25'	7.6	2639'	10" x 10"	0.29	Mikropul

Note: The base elevation of the Handy Truck Lines, Meridian Terminal is 2614 feet above sea level.